What is claimed is:

1. A method of dynamically determining a multimedia streaming data rate between multiple points in a communications network in which one or more points send data, servers, and one or more points receive data, clients, the method comprising the steps of:

estimating an amount of data buffered in the network, BYTE_{BUFFERED}, at a time a feedback report, FR, is received from the client; and

calculating a streaming data rate set point based on the estimated $\mathsf{BYTE}_{\mathsf{BUFFERED}}$ and other information from the server.

2. The method of claim 1, wherein the step of estimating BYTE_{BUFFERED} comprises:

determining the difference between an accumulative number of bytes sent from the server and an accumulative number of bytes received by the client;

adjusting the determined difference by an uplink delay compensation value; and

adjusting the determined difference by an estimated amount of accumulative packets lost.

- 3. The method of claim 2, wherein the uplink delay compensation value is computed as the amount of data sent out by the server during a most previous uplink delay period.
- 4. The method of claim 2, wherein the uplink delay compensation value is computed from an estimated uplink delay and either a most recent instantaneous receive rate or an averaged receive rate calculated from the information reported in FR.

- 5. The method of claim 2, wherein the value of the uplink delay can be static or can be dynamically estimated.
- 6. The method of claim 5, wherein a dynamic determination of the uplink delay comprises the steps of

determining the initial value based on initial round trip time, RTT, estimation; iterative correction based on measured uplink jitter; and setting an upper bound and lower bound.

- 7. The method of claim 2, wherein the packet loss compensation value is computed as the accumulative amount of data bytes lost from the beginning of the streaming.
- 8. The method of claim 2, wherein the packet loss compensation value is computed from the number of packets lost reported in the FR and either a short term or long term average packet size.
- 9. The method of claim 1, wherein the other information includes any combination of a pre-adjustment data rate set point, a target byte count, BYTE_{TARGET}, a most recent estimated received data rate, a previous server streaming data rate, an excess send rate, a required send rate change and a tuning parameter.
- 10. The method of claim 9, wherein the step of calculating the streaming data rate set point includes:

calculating the streaming data rate set point as the most recent estimated received data rate plus the required send rate change multiplied by the tuning parameter.

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11. The method of claim 9, wherein the step of calculating the streaming data rate set point includes:

calculating the streaming data rate set point as the pre-adjustment data rate set point minus the excess send rate plus the required send rate change multiplied by the tuning parameter.

- 12. The method of claim 9, wherein the step of calculating the streaming data rate set point further includes imposing an upper and lower bound on the data rate set point.
- 13. The method of claim 12, wherein the upper and lower bounds imposed on the data rate set point are determined by the server based on a multimedia source encoding range or capabilities of the communications network.
- 14. The method of claim 13, wherein the upper and lower bounds imposed on the data rate set point are determined on a per stream basis by the server.
- 15. The method of claim 9, wherein the received data rate is calculated as the bytes received within a period between receiving a last and current FR divided by a FR report interval.
- 16. The method of claim 9, wherein the required send rate change is calculated as the difference between $\text{BYTE}_{\text{TARGET}}$ and $\text{BYTE}_{\text{BUFFERED}}$ divided by a FR report interval.
- 17. The method of claim 9, wherein the excess send rate is calculated as the previous server streaming data rate minus the most recent estimated received data rate.

- 18. The method of claim 9, wherein the excess send rate is calculated as the estimated BYTE_{BUFFERED} change within a period between receiving a last and a current FR divided by a FR report interval.
- 19. The method of claim 9, wherein the tuning parameter is determined based on a comparison between $BYTE_{BUFFERED}$ and $BYTE_{TARGET}$.
- 20. The method of claim 9, wherein $BYTE_{TARGET}$ is determined by the server based on a multimedia source encoding rate, a client jitter buffer depth, or characteristics of the communications network.
- 21. The method of claim 20, wherein $\mathsf{BYTE}_{\mathsf{TARGET}}$ is determined on a per stream basis by the server.
- 22. The method of claim 9, wherein the tuning parameter is user definable so as to customize the data rate set point calculation process.
- 23. The method of claim 22, wherein the data rate set point calculation process is customized in order to efficiently utilize an available bandwidth of the communications network.
- 24. The method of claim 9, wherein the tuning parameter can be determined either statically or dynamically.
- 25. The method of claim 24, wherein a static determination of the tuning parameter comprises setting the tuning parameter as a predefined set of constants.

- 26. The method of claim 24, wherein a dynamic determination of the tuning parameter comprises defining the tuning parameter based on a set of buffer threshold values.
- 27. The method of claim 24, wherein a dynamic determination of the tuning parameter comprises defining the tuning parameter as a function of BYTE_{BUFFERED}.
 - 28. The method of claim 1 wherein the method further comprises steps of:

gradually changing the data rate set point by the server if a next FR is not received from the client at an expected time; and

if the server does not receive FR over an extended period of time due to the presence of a long transmission gap, then pausing the streaming until either a new FR is received or eventually a timeout is reached, and when streaming is first resumed after pausing, the streaming data rate set point is calculated as a most recent estimated receive data rate plus a required send rate change multiplied by a tuning parameter.

- 29. The method of claim 28, wherein the step of gradually changing the data rate set point includes gradually increasing the data rate set point.
- 30. The method of claim 28, wherein the step of gradually changing the data rate set point includes gradually decreasing the data rate set point.
- 31. The method of claim 30, wherein the step of gradually decreasing the data rate set point includes:

calculating a decreased data rate set point as an immediately prior data rate set point minus a scaled difference between the prior data rate set point and a minimum data rate set point.

- 32. The method of claim 31, wherein the difference between the prior data rate set point and the minimum data rate set point is scaled by a rate delay parameter which is an adjustable percentage value defined by the server.
- 33. The method of claim 1, wherein the communications network utilizes Real-Time Transport Protocol/Real-Time Control Protocol (RTP/RTCP) on top of User Datagram Protocol/Internet Protocol (UDP/IP) for data delivery.
- 34. The method of claim 1, wherein the communications network is a wireless network.
- 35. The method of claim 1, wherein the FR may be sent from the client at a fixed interval, T_{FR} , at a random interval having a mean T_{FR} calculated based on a predefined probability distribution function, or upon the trigger of a first data packet arrival a fixed interval, target T_{FR} , after the send time of the last FR.
- 36. A method for dynamically adjusting a data transmission rate between two points in a communications network, the method comprising steps of:

estimating an amount of data buffered in the network, $BYTE_{BUFFERED}$, at a time a feedback report, FR, is received from a client;

calculating a data rate set point based on the estimated $\mathsf{BYTE}_{\mathsf{BUFFERED}}$ and other information from a server; and

imposing an upper and lower bound on the data rate set point, to establish minimum and maximum data rate set points, respectively.

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37. A method for dynamically adjusting a multimedia data rate between two points in a communications network, the method comprising steps of:

estimating an amount of data buffered in the network, $BYTE_{BUFFERED}$, at a time a feedback report, FR, is received from the client;

calculating a data rate set point based on the estimated BYTE_{BUFFERED} and other information from the server;

imposing an upper and lower bound on the data rate set point, to establish minimum and maximum data rate set points, respectively; and

gradually changing the data rate set point by the server if a next FR has not been received from the client within a specified time period.